SEQUENCE LISTING

(1) GENERAL INFORMATION:

(i) APPLICANT: TZAHI ARAZI, YOEL MOSHE SHIBOLETH AND AMIT GAL-ON

(ii) TITLE OF INVENTION: VECTORS FOR EXPRESSING HETEROLOGOUS PEPTIDES AT THE AMINO-TERMINUS OF POTYVIRUS COAT Protein, methods for use thereof, plantS infected with same and methods of vaccination using same

(iii) NUMBER OF SEQUENCES: 33

(iv) CORRESPONDENCE ADDRESS:

(A) ADDRESSEE: Mark M. Friedman C/O Mr. Bill Polkinghorn Discovery Dispatch

(II) STREET: 9003 Florin Way

(C) CITY: Upper Marlboro

(D) STATE: Maryland

(E) COUNTRY: United States of America

(F) ZIP: 20772

(v) COMPUTER READABLE FORM:

(A) MEDIUM TYPE: 1.44 megabyte, 3.5" microdisk

(B) COMPUTER: Twinhead* Slimnote-890TX

(C) OPERATING SYSTEM: MS DOS version 6.2, Windows version 3.11

(D) SOFTWARE: Word for Windows version 2.0 converted to an ASCI file

(vi) CURRENT APPLICATION DATA:

(A) APPLICATION NUMBER: XXX

(B) FILING DATE: XXX

(C) CLASSIFICATION: XXX

(vii) PRIOR APPLICATION DATA:

(A) APPLICATION NUMBER: 60/253,136

(B) FILING DATE: 28 November, 2000

(C) APPLICATION NUMBER:

(D) FILING DATE:

(V) APPLICATION NUMBER:

(F) FILING DATE:

(viii) ATTORNEY/AGENT INFORMATION:

(A) NAME: Friedmam, Mark M.

(B) REGISTRATION NUMBER: 33,883

(C) REFERENCE/DOCKET NUMBER: 1686/4

(ix) TELECOMMUNICATION INFORMATION:

(A) TELEPHONE: 972-3-5625553

(B) TELEFAX: 972-3-5625554

(C) TELEX:

(2) INFORMATION FOR SEQ ID NO:1:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 837

(B) TYPE: nucleic acid

(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

```
TCAGGCACTC AGCCAACTGT GGCAGATGCT GGAGCTACAA AGAAAGATAA 50
AGAAGATGAC AAAGGGAAAA ACAAGGACGT TACAGGCTCC GGCTCAGGTG 100
AGAAAACAGT AGCAGCTGTC ACGAAGGACA AGGATGTGAA TGCTGGTTCT 150
CATGGGAAAA TTGTGCCGCG TCTTTCGAAG ATCACAAAGA AAATGTCATT 200
GCCACGCGTG AAAGGAAATG TGATACTCGA TATTGATCAT TTGCTGGAAT 250
ATAAACCGGA TCAAATTGAG TTATATAACA CACGAGCGTC TCATCAGCAG 300
TTCGCCTCTT GGTTCAACCA GGTTAAGACG GAATATGATT TGAACGAGCA 350
ACAGATGGGA GTTGTAATGA ATGGTTTCAT GGTTTGGTGC ATTGAGAATG 400
```

```
GCACTTCACC CGACATTAAT GGAGTGTGGG TTATGATGGA CGGAAATGAG 450
CAAGTTGAGT ATCCCTTGAA ACCAATAGTT GAAAATGCAA AGCCAACGCT 500
GCGGCAAATA ATGCATCATT TTTCAGATGC AGCGGAGGCA TATATAGAGA 550
TGAGAAATGC AGAGGCACCA TACATGCCGA GGTATGGTTT GCTTCGAAAC 600
CTACGGGATA GGAGTTTAGC ACGATATGCT TTTGATTTCT ATGAAGTCAA 650
TTCTAAAACT CCTGAAAGAG CCCGCGAAGC TGTTGCGCAG ATGAAAGCAG 700
CAGCTCTTAG CAATGTTTCT TCAAGGTTGT TTGGCCTTGA TGGAAATGTT 750
GCCACCACTA GCGAAGACAC TGAACGGCAC ACTGCACGTG ATGTTAATAG 800
AAACATGCAC ACCTTACTAG GTGTGAATAC AATGCAG               837
```

(2) INFORMATION FOR SEQ ID NO:2:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 279
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

```
Ser Gly Thr Gln Pro Thr Val Ala Asp Ala Gly Ala Thr Lys Lys
  5                  10                  15
Asp Lys Glu Asp Asp Lys Gly Lys Asn Lys Asp Val Thr Gly Ser
            20                  25                  30
Gly Ser Gly Glu Lys Thr Val Ala Ala Val Thr Lys Asp Lys Asp
            35                  40                  45
Val Asn Ala Gly Ser His Gly Lys Ile Val Pro Arg Leu Ser Lys
            50                  55                  60
Ile Thr Lys Lys Met Ser Leu Pro Arg Val Lys Gly Asn Val Ile
            65                  70                  75
Leu Asp Ile Asp His Leu Leu Glu Tyr Lys Pro Asp Gln Ile Glu
            80                  85                  90
Leu Tyr Asn Thr Arg Ala Ser His Gln Gln Phe Ala Ser Trp Phe
            95                  100                 105
Asn Gln Val Lys Thr Glu Tyr Asp Leu Asn Glu Gln Gln Met Gly
            110                 115                 120
Val Val Met Asn Gly Phe Met Val Trp Cys Ile Glu Asn Gly Thr
            125                 130                 135
Ser Pro Asp Ile Asn Gly Val Trp Val Met Met Asp Gly Asn Glu
            140                 145                 150
Gln Val Glu Tyr Pro Leu Lys Pro Ile Val Glu Asn Ala Lys Pro
            155                 160                 165
Thr Leu Arg Gln Ile Met His His Phe Ser Asp Ala Ala Glu Ala
            170                 175                 180
Tyr Ile Glu Met Arg Asn Ala Glu Ala Pro Tyr Met Pro Arg Tyr
            185                 190                 195
Gly Leu Leu Arg Asn Leu Arg Asp Arg Ser Leu Ala Arg Tyr Ala
            200                 205                 210
Phe Asp Phe Tyr Glu Val Asn Ser Lys Thr Pro Glu Arg Ala Arg
            215                 220                 225
Glu Ala Val Ala Gln Met Lys Ala Ala Ala Leu Ser Asn Val Ser
            230                 235                 240
Ser Arg Leu Phe Gly Leu Asp Gly Asn Val Ala Thr Thr Ser Glu
            245                 250                 255
Asp Thr Glu Arg His Thr Ala Arg Asp Val Asn Arg Asn Met His
            260                 265                 270
Thr Leu Leu Gly Val Asn Thr Met Gln
            275                 279
```

(2) INFORMATION FOR SEQ ID NO:3:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 20
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: Single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

```
CATTTCCTTT CACGCGTGGC 20
```

(2) INFORMATION FOR SEQ ID NO:4:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 21
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: Single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

```
TCACACCATC ACCATCACCA  T                                  21
```

(2) INFORMATION FOR SEQ ID NO:5:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 7

(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

Ser His His His His His His
5 7

(2) INFORMATION FOR SEQ ID NO:6:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 53
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

CAGCTGCAGT CACACCATCA CCATCACCAT TCAGGCACTC AGCCAACTGT 50
GGC 53

(2) INFORMATION FOR SEQ ID NO:7:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 55
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

CAGCTGCAGT CACACCATCA CCATCACCAT GATACTGGAG CTACAAAGAA 50
AGAAG 55

(2) INFORMATION FOR SEQ ID NO:8:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 55
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

TCAGCATCAG AGCAGAAGCT CATTTCAGAG GAGGATCTCG GATCC 45

(2) INFORMATION FOR SEQ ID NO:9:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 15
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:
Ser Ala Ser Glu Gln Lys Leu Ile Ser Glu Glu Asp Leu Gly Ser
5 10 15

(2) INFORMATION FOR SEQ ID NO:10:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 77
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

CAGCTGCAGT CAGCATCAGA GCAGAAGCTC ATTTCAGAGG AGGATCTCGG 50
ATCCTCAGGC ACTCAGCCAA CTGTGGC 77

(2) INFORMATION FOR SEQ ID NO:11:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 82
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:x:

CAGCTGCAGT CAGCATCAGA GCAGAAGCTC ATTTCAGAGG AGGATCTCGG 50
ATCCGATACT GGAGCTACAA AGAAAGATAA AG 82

(2) INFORMATION FOR SEQ ID NO:12:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 81
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single

(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

CAGCTGCAGT CAGCATCAGA GCAGAAGCTC ATTTCAGAGG AGGATCTCGG 50
ATCCAAGAAA GATAAAGAAG ATGACAAAGG G 81

(2) INFORMATION FOR SEQ ID NO:13:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 31
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:x:

CGCGGATCCG ATGACAAAGG GAAAAACAAG G 31

(2) INFORMATION FOR SEQ ID NO:14:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 30
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

CTCGGATCCA ACAAGGATGT TACAGGCTCC 30

(2) INFORMATION FOR SEQ ID NO:15:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 27
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

CGCGGATCCG GCTCCGGCTC AAGTGAG 27

(2) INFORMATION FOR SEQ ID NO:16:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 30
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

CGCGGATCCG AGAAAACAGT GGCAGCTGTC 30

(2) INFORMATION FOR SEQ ID NO:17:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 28
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

CGCGGATCCG CTGTCACGAA GGACAAGG 28

(2) INFORMATION FOR SEQ ID NO:18:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 33
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

CGCGGATCCA AGGATGTAAA TGCTGGTTCT CAT 33

(2) INFORMATION FOR SEQ ID NO:19:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 30
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

CTCGGATCCG GTTCTCATGG GAAAATTGTG 30

(2) INFORMATION FOR SEQ ID NO:20:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 51
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

AGTGTGAGAG GAGATCTTCA AGTGCTTGCA CGAAAAGCAG CAAGACCACT 50
T 51

(2) INFORMATION FOR SEQ ID NO:21:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

Ser Val Arg Gly Asp Leu Gln Val Leu Ala Arg Lys Ala Ala Arg
5 10 15
Pro Leu
17

(2) INFORMATION FOR SEQ ID NO:22:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 87
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

CAGCTGCAGT CCGTGAGAGG AGATCTTCAA GTGCTTGCAC GAAAAGCAGC 50
AAGACCACTT AAGAAAGATA AAGAAGATGA CAAAGGG 87

(2) INFORMATION FOR SEQ ID NO:23:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 83
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

CAGCTGCAGA GTGTGAGAGG AGATCTTCAA GTGCTTGCAC GAAAAGCAGC 50
AAGACCACTT TCAGGCACTC AGCCAACTGT GGC 83

(2) INFORMATION FOR SEQ ID NO:24:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 84
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

CGCGGATCCG TGAGAGGAGA TCTTCAAGTG CTTGCACGAA AAGCAGCAAG 50
ACCACTTAAG AAAGATAAAG AAGATGACAA AGGG 84

(2) INFORMATION FOR SEQ ID NO:25:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 33
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

CAGCTGCAGT CCGAGAAAAC AGTGGCAGCT GTC 33

(2) INFORMATION FOR SEQ ID NO:26:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 34
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

CAGCTGCAGT CCGACACTGG AGCCACAAAG AAAG 34

(2) INFORMATION FOR SEQ ID NO:27:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 37
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

CAGCTGCAGT CCAAGAAAGA CAAAGAAGAT GACAAAG 37

(2) INFORMATION FOR SEQ ID NO:28:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 24
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

TCCATTATTA ATTTCGAAAA GTTG 24

(2) INFORMATION FOR SEQ ID NO:29:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 8
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

Ser Ile Ile Asn Phe Glu Lys Leu
5 8

(2) INFORMATION FOR SEQ ID NO:30:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 56
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

CAGCTGCAGT CCATTATTAA TTTCGAAAAG TTGTCAGGCA CTCAGCCAAC 50
TGTGGC 56

(2) INFORMATION FOR SEQ ID NO:31:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 56
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

CAGCTGCAGT CCGAGAAAAC AGTGGCAGCT GTC 33

(2) INFORMATION FOR SEQ ID NO:32:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 22
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

AGCTCCATAC ATAGCTGAGA CA 22

(2) INFORMATION FOR SEQ ID NO:33:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 20
(B) TYPE: nucleic acid
(C) STRANDEDNESS: Single
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

TGGTTGAACC AAGAGGCGAA 20